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SPECIFICATION FOR AGRICULTURAL LIMING MATERIALS AS SOIL AMENDMENTS

PART 1 HYDRATED LIME AND BURNT LIME

(*First Revision*)

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SPECIFICATION FOR AGRICULTURAL LIMING MATERIALS AS SOIL AMENDMENTS

PART 1 HYDRATED LIME AND BURNT LIME

(First Revision)

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AMENDMENT NO. 2 SEPTEMBER 2012
TO
IS 5409 (PART 1) : 1985 SPECIFICATION FOR AGRICULTURAL LIMING MATERIALS AS SOIL AMENDMENTS

PART 1 HYDRATED LIME AND BURNT LIME

(First Revision)

[*Page* 5, *clause* **5.2**(b)] — Substitute ‘Quantity of the material in the package;’ *for* ‘Mass of the material in the package;’.

(FAD 7)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 1 MARCH 1996
TO
IS 5409 (Part 1) : 1985 SPECIFICATION FOR AGRICULTURAL LIMING MATERIALS AS SOIL AMENDMENTS

PART 1 HYDRATED LIME AND BURNT LIME

(First Revision)

(Page 3, clause 0.4) — Substitute 'IS 1540 (Part 2) :1990†' *for* 'IS : 1540 (Part 2) -1978†'.

(*Page 3, foot-note marked* '†') — Substitute '(*third revision*)' *for* '(*second revision*)' at the end of text.

(*Page 5, clause* **4.1**) — Substitute 'IS 1514 :1990*' *for* 'IS : 1514 - 1959*'

(*Page* 5, *Table* 1, *column* 6) — Substitute 'IS 1514 1990*' *for* 'IS 1514 - 1959*'.

(Page 5, foot-note marked '*') *-Add* '(*first revision*)' at the end of text

(*Page* 6, *clause* 6.1) — Substitute 'IS 1514 :1990*' *for* 'IS : 1514 - 1959*'.

(*Page* 6, *foot-note marked* '*') — Add '(first *revision)*' at the end of text

(*Page* 6, *clause* 7.2) — Substitute '(see IS 1070 :1992†)' *for* '(*see* IS : 1070 - 1977†)'.

(*Page* 6, *foot-note marked* '†') — Substitute '**Reagent grade water** (*third revision)*' for the existing title

(FAD27)

Reprography Unit, BIS, New Delhi, India

Indian Standard

SPECIFICATION FOR AGRICULTURAL LIMING MATERIALS AS SOIL AMENDMENTS

PART 1 HYDRATED LIME AND BURNT LIME

(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 30 August 1985, after the draft finalized by the Soil Amendments and Reclamation of Problem Soils Sectional Committee had been approved by the Agricultural and Food Products Division Council.

0.2 Hydrated lime and burnt lime, apart from being important raw materials for various chemical industries, are also used for correcting soil acidity to create optimal plant growth conditions in acidic soils. These amendments are among the few liming materials known for their high Calcium Carbonate Equivalent (CCE) percent and usually have rapid neutralizing effect on acidic soils.

0.3 This standard was first published in 1969 The liming materials such as limestone, dolomite, basic slag, sea shells, pressmud, by-product, calcium carbonate and by-product hydrated lime have been included. Since the neutralizing value and physical characteristics of liming materials vary to a great extent, it was considered desirable to prepare separate specifications for different liming materials used as soil amendments. Hence, a series of Indian Standards covering different liming materials used as soil amendments is being prepared. Limestone and dolomite have been covered under Part 2. It is hoped that adoption of these standards would enable both consumers and producers for procuring and supplying quality materials.

0.4 The requirements for quick lime and hydrated lime for chemical industries, have been covered in IS . 1540 (Part 1)-1980[*] and IS : 1540 (Part 2)-1978[†] respectively.

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[*] Specification for quick lime and hydrated lime for chemical industries: Part 1 Quick lime (*second revision*).

[†] Specification for quick lime and hydrated lime for chemical industries: Part 2 Hydrated lime (*second revision*).

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard (Part 1) prescribes the requirements and methods of sampling and test for hydrated lime and burnt lime used as soil amendments.

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definitions shall apply.

2.1 Agricultural Liming Material — A product containing calcium and magnesium compounds capable of neutralizing soil acidity.

2.2 Calcium Carbonate Equivalent (CCE) Percent — It is the acid neutralizing capacity of the agricultural liming material and is defined as the number of parts by mass of pure calcium carbonate which has the same acid neutralizing capacity as 100 parts by mass of the agricultural liming material

2 3 Hydrated Lime — A powder obtained by treating quick lime with water enough to satisfy its chemical affinity for water under the conditions of hydration.

2.4 Burnt Lime or Quick Lime — A calcined material the major part of which is CaO or CaO in natural association with lesser amount of MgO, capable of slaking with water.

2.5 Active Lime (Available) — The proportion of the liming material which enters into a desired reaction under the conditions of a specified method.

2.6 Dead, Burnt or Over-Burnt Lime — Lime which is not made available in any chemical reaction.

3. GRADES

3.1 There shall be two grades of liming materials, namely, Grade I and Grade II.

---

*Rules for rounding off numerical values (*revised*).

4. REQUIREMENTS

4.1 Fineness — When tested by the method prescribed in **15** of IS : 1514-1959*, 90 percent of the material shall pass through 2-mm sieve and 25 percent shall pass through 0·15-mm sieve.

4.2 The material shall also comply with the requirements specified in Table 1.

TABLE 1 REQUIREMENTS FOR HYDRATED LIME AND BURNT LIME AS SOIL AMENDMENTS

Sl No.	Characteristic	Requirements		Method of Test, Ref to	
		Grade I	Grade II	Appendix of This Standard	Cl No. of IS : 1514-1959*
(1)	(2)	(3)	(4)	(5)	(6)
i)	Neutralizing value expressed as calcium carbonate equivalent (CCE), percent, *Min*	100	80	A	—
ii)	Active lime (available) (as CaO), percent by mass, *Min*	80	70	—	8
iii)	Magnesium (as MgO), percent by mass, *Max*	2·0	3 0	—	12
iv)	Moisture content, percent by mass, *Max*	10	12	B	—
v)	Dead burnt lime (as CaO), percent by mass, *Max*	3 0	4 0	—	14

*Methods of sampling and test for quick lime and hydrated lime.

5. PACKING AND MARKING

5.1 Packing — The material shall be supplied in bulk or in packages as agreed to between the purchaser and the supplier.

5.2 Marking — When supplied in packages, each package shall securely be closed and marked with the following information:

a) Name and grade of the material;
b) Mass of the material in the package;
c) Neutralizing value and active CaO content of the material;

---

*Methods of sampling test for quick lime and hydrated lime.

d) Supplier's name and recognized trade-mark, if any; and

e) Lot number to enable the consignment to be traced back to the record.

5.2.1 When supplied in bulk, a good sized metallic label bearing the above information shall be conspicuously displayed on the bulk carrier and also placed inside.

5.2.2 The material may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the *Indian Standards Institution (Certification Marks) Act and the Rules and Regulations* made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

6. SAMPLING

6.1 The procedure for drawing representative samples of the material and the criteria for finding out the conformity of the material to the requirements of this specification shall be as prescribed in **3** of IS . 1514-1959*.

7. TESTS

7.1 Tests shall be carried out by the appropriate methods referred to in col 5 and 6 of Table 1.

7.2 Quality of Reagents — Unless specified otherwise, pure chemicals and distilled water (*see* IS : 1070-1977†) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the result of analysis.

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*Methods of sampling and test for quick lime and hydrated lime.

†Specification for water for general laboratory use (*second revision*).

APPENDIX A

[*Table* 1, *Sl No.* (i)]

DETERMINATION OF NEUTRALIZING VALUE

A-0. PRINCIPLE — The ground sample is heated with an excess of standard acid and the excess acid is back-titrated.

A-1. REAGENTS

A-1.1 Standard Hydrochloric Acid — 0·5 N.

A-1.2 Standard Sodium Hydroxide Solution — 0·5 N.

A-1.3 Phenolphthalein Indicator Solution — Dissolve 0·1 g of phenolphthalein in 60 ml of rectified spirit (conforming to IS : 323-1959*) and dilute with water to 100 ml.

A-2. PROCEDURE

A-2.1 Weigh accurately about 0·5 g of the previously ground sample to pass through 250 µm IS sieve, in a 250-ml stoppered conical flask. Add 40 ml of standard hydrochloric acid, with swirling. Heat to gentle boiling, agitating continuously. Boil for 5 minutes and then cool to room temperature. Titrate against standard sodium hydroxide solution using 2 to 3 drops of phenolphthalein indicator.

A-2.1.1 Carry out a blank test using the same quantities of all reagents but without adding the sample.

A-2.2 Calculation

$$\text{Neutralizing value (as } CaCO_3 \text{), percent by mass} = \frac{5\,(B - A)\,N}{M}$$

where

B = volume in ml of standard sodium hydroxide solution used in the blank determination,

A = volume in ml of standard sodium hydroxide solution used with the sample,

N = normality of standard sodium hydroxide solution, and

M = mass in g of the sample taken for the test.

---

*Specification for rectified spirit (*revised*).

APPENDIX B

[*Table* 1, *Sl No.* (iv)]

DETERMINATION OF MOISTURE CONTENT

B-1. PROCEDURE

B-1.1 Weigh accurately 2 g of the powdered sample in a platinum or silica dish. Place it in an oven maintained at 105° ± 2°C, until on cooling in a desiccator and weighing, constant mass (± 2 mg) is obtained. Calculate the percent moisture in the sample

B-2. CALCULATION

B-2.1 Moisture, percent by mass $= \frac{100\,(M_1 - M_2)}{M_1 - M}$

where

M_1 = mass in g of the moisture dish with the material before drying,

M_2 = mass in g of the moisture dish with the material after drying, and

M = mass in g of the empty moisture dish.

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